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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/898,439	07/05/2001	Tue Nguyen	SIM077	1885

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EXAMINER

HOANG, QUOC DINH

ART UNIT	PAPER NUMBER
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2818

DATE MAILED: 07/14/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/898,439	NGUYEN ET AL.	
	Examiner	Art Unit	
	Quoc D Hoang	2818	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
 - If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
 - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
 - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 April 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 and 21-29 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16 and 21-29 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 April 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. Amendment filed on 4/26/2004 has been entered and made of record as Paper No. 0404. In Amendment, applicants cancel claims 17-20. Claims 25-29 are newly added. Claims 1-16 and 21-29 are remained for examination in Paper No. 0404 is acknowledged.

Applicant's remarks have been considered.

Drawings

2. The drawings were received on 4/26/2004. These drawings are acceptable.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claim 1-9, 21-23, and 25-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ngan., (US Patent 5,919,342) and in view of Houchin et al., (US Pat 5,202,095) ("Houchin").

Regarding claim 1, Ngan., Fig. 2, and related text on column 1 which discloses an apparatus to perform semiconductor processing, comprising: a process chamber 170 (col. 1, lines 35-55 and Fig. 2); a plasma generator 188 for generating a plasma in the process chamber 170 (col. 1, lines 35-55 and Fig. 2); and a helical electrode 186 coupled to the output of the plasma generator 188 (col. 1, lines 35-55 and Fig. 2).

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Ngan does not clearly teach wherein the helical electrode comprises a ribbon coil having a width that is greater than its thickness.

However, Houchin discloses a plasma chamber 9, wherein the helical electrode 16a comprises a ribbon coil having a width that is greater than its thickness (col. 2, lines 45-67 and Figs. 1-2). At the time of the invention was made, it would have been obvious to a person of ordinary skill in the art to combine the ribbon coil teaching of Houchin with Ngan's plasma chamber, because it would have improved the characteristic, such as uniformity of the deposited layer as taught by Houchin, column 3, lines 24-26.

Regarding claim 2, Houchin discloses the ribbon coil 9a is external to the process chamber 9 (col. 2, lines 45-67 and Figs. 1-2).

Regarding claim 3, Houchin discloses a dielectric wall 12 position between the chamber 9 and the ribbon coil 9a (col. 2, lines 45-67 and Figs. 1-2).

Regarding claims 4-7, Houchin discloses the dielectric wall 12 is a flat plate, tube or concave (col. 2, lines 45-67 and Figs. 1-5).

Regarding claim 8, Houchin discloses the dielectric wall 12 projects through a center of the ribbon coil 9a (Fig. 1).

Regarding claim 9, Ngan., discloses the helical electrode 186 is internal to the process chamber 170 (see Fig. 2).

Regarding claims 21-23, Houchin discloses the helical electrode 16a is helical coil, wherein the spiral turns are similar in size, and has an elongated cross section (col. 2, lines 45-67 and Fig. 2).

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Regarding claim 25, Houchin discloses wherein the helical electrode 16a comprises a ribbon coil having a width that is substantially greater than its thickness (col. 2, lines 45-67 and Figs. 1-2).

Claim 26 is are rejected as being prima facie obvious without showing that the claimed ranges (ratio, width difference) achieve unexpected results relative to the prior art range.

In re Woodruff, 16 USPQ2d 1935, 1937 (Fed. Cir. 1990). See also In re Huang, 40 USPQ2d 1685, 1688 (Fed. Cir. 1996) (claimed ranges of a result effective variable, which do not overlap the prior art ranges, are unpatentable unless they produce a new and unexpected result which is different in kind and not merely in degree from the results of the prior art). See also In re Boesch, 205 USPQ 215 (CCPA) (discovery of optimum value of result effective variable in known process is ordinarily within skill of art) and In re Aller, 105 USPQ 233 (CCPA 1955) (selection of optimum ranges within prior art general conditions is obvious).

It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to use the optimum ranges for width to length ratio of the coil in apparatus of Houchin.

5. Claims 10 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ngan., (US Patent 5,919,342) and Houchin et al., (US Pat 5,202,095) as applied to claim 1 above, and further in view of Ishizuka et al (US Pat 5,531,834).

Ngan does not disclose wherein the distance between the helical electrode 186 and a workpiece 175 is less than five inches. However, Ishizuka et al., discloses the

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apparatus is adapted to receive a workpiece W in the chamber 1 and wherein the distance between the coil electrode 13 and the workpiece W is less than five inches (col. 12, lines 34-43 and Fig. 1). At the time of the invention was made, it would have been obvious to a person of ordinary skill in the art to combine the distance between the coil electrode and the workpiece teaching of Ishizuka et al with Ngan's plasma chamber, because it would have allowed the plasma to be generated as taught by Ishizuka et al, column 12, lines 134-45.

6. Claims 12-16, 24 and 27-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ngan., (US Patent 5,919,342) and in view of Houchin et al., (US Pat 5,202,095) ("Houchin") as applied to claim 1 above, and further in view of Qian et al., (US Pat 6,447,636).

Regarding claim 24, Ngan., Fig. 2, and related text on column 1 which discloses a multi-layer processing chamber, comprising a gas source 192 and 194 coupled to the chamber 170 for introducing a processing gas into a reaction chamber 170 having a sample disposed therein (col. 1, lines 35-55 and Fig. 2); a solid state RF plasma source 188 coupled to the chamber 170 to excite the processing gas (col. 1, lines 35-55 and Fig. 2); and a helical electrode 186 adapted to excite the plasma (col. 1, lines 35-55 and Fig. 2).

Ngan does not clearly teach wherein the helical electrode comprises a ribbon electrode having an elongated cross section. Ngan also does not teach a controller coupled to the RF plasma source to pulse the RF plasma source for each deposited layer.

However, Houchin discloses a plasma chamber 9, wherein the helical electrode 16a comprises a helical ribbon electrode having an elongated cross section (col. 2, lines 45-67 and Figs. 1-2). At the time of the invention was made, it would have been obvious to a person of ordinary skill in the art to combine the helical ribbon electrode teaching of Houchin with Ngan's plasma chamber, because it would have improved the characteristic, such as uniformity of the deposited layer as taught by Houchin, column 3, lines 24-26.

Ngan and Houchin do not teach a controller coupled to the RF plasma source to pulse the RF plasma source for each deposited layer.

Regarding claims 24, Qian et al discloses in figure 1 and on page 10, lines 1-67 a system controller 140 coupled to the solid state RF plasma source 105 to pulse the solid state RF plasma source 105 for each deposited layer (col. 10, lines 1-10 and Fig. 1). At the time of the invention was made, it would have been obvious to a person of ordinary skill in the art to combine the controller teaching of Qian et al with Ngan's plasma chamber, because it would have improved the characteristic, such as uniformity of the deposited layer as taught by Qian et al, column 2, lines 12-35.

Regarding claims 12-16, Qian et al., discloses in figure 1 and on page 10, lines 1-67 a system controller 140 coupled to the solid state RF plasma source 105 to pulse the solid state RF plasma source 105 for each deposited layer (col. 10, lines 1-10 and Fig. 1).

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Regarding claims 27-28, Houchin discloses wherein the helical electrode 16a comprises a ribbon coil having a width that is substantially greater than its thickness (col. 2, lines 45-67 and Figs. 1-2).

Claim 29 is are rejected as being prima facie obvious without showing that the claimed ranges (ratio, width difference) achieve unexpected results relative to the prior art range.

In re Woodruff, 16 USPQ2d 1935, 1937 (Fed. Cir. 1990). See also In re Huang, 40 USPQ2d 1685, 1688 (Fed. Cir. 1996) (claimed ranges of a result effective variable, which do not overlap the prior art ranges, are unpatentable unless they produce a new and unexpected result which is different in kind and not merely in degree from the results of the prior art). See also In re Boesch, 205 USPQ 215 (CCPA) (discovery of optimum value of result effective variable in known process is ordinarily within skill of art) and In re Aller, 105 USPQ 233 (CCPA 1955) (selection of optimum ranges within prior art general conditions is obvious).

It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to use the optimum ranges for width to length ratio of the coil in apparatus of Houchin.

Conclusion

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

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A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Quoc Hoang whose telephone number is (571) 272-1780. The examiner can normally be reached on Monday-Friday from 8.00 AM to 5.00 PM.

If attempt to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms can be reached on (571) 272-1787. The fax phone numbers of the organization where this application or proceeding is assigned are (703) 872-9306 for regular communications and (703) 872-9306 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.


Quoc Hoang
Patent examiner/AU 2818.


David Nelms
Supervisory Patent Examiner
Technology Center 2800